

Artificial Labor Market for ACCESS

**(Accessions Command Continuous Experimentation and
Simulation System)**



Prof. Alok R. Chaturvedi, Director
alok@purdue.edu

Purdue e-business Research Center
Purdue University
West Lafayette, IN 47906

Outline

- Problems with current modeling paradigms
- Accessions Command Continuous Experimentation and Simulation System (ACCESS)
- Artificial Labor Market: Creation and Calibration
- Future Capabilities
- Other SEAS Implementations
- Q&A

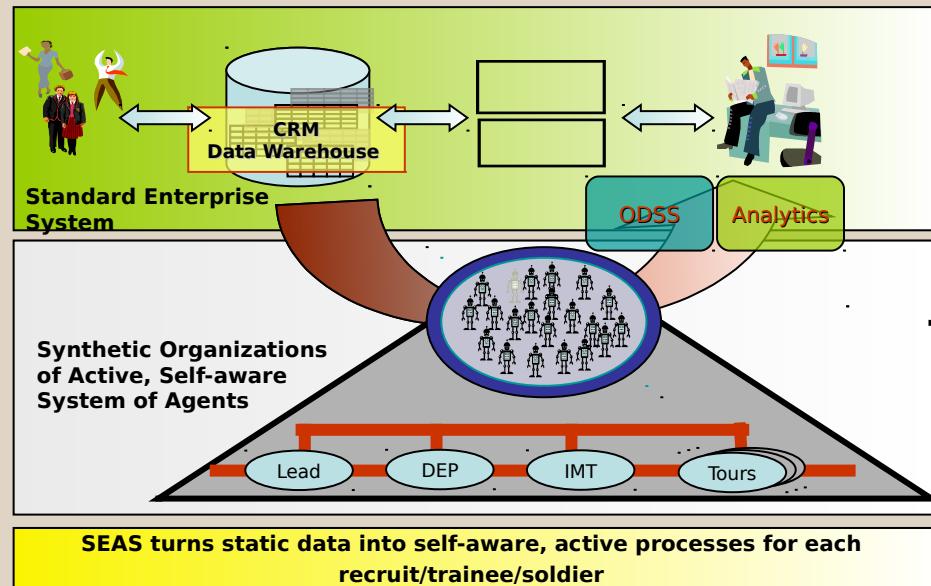
Problems with Current Modeling Paradigms

- Field Studies
 - Individual level study
 - » Very Expensive
 - » Aggregation to population level grossly inaccurate
 - Group level Study
 - » Cheaper
 - » Aggregation to population level inaccurate
 - Population level study
 - » Cheaper
 - » Projections to individual level inaccurate
- Analytical study
 - Cheap
 - Simplified models, limited practical use
- Simulations
 - Expensive to build
 - Obsolete before it is fielded because current models hard to develop, field and maintain

Accessions Command Continuous Experimentation and Simulation System (ACCESS)

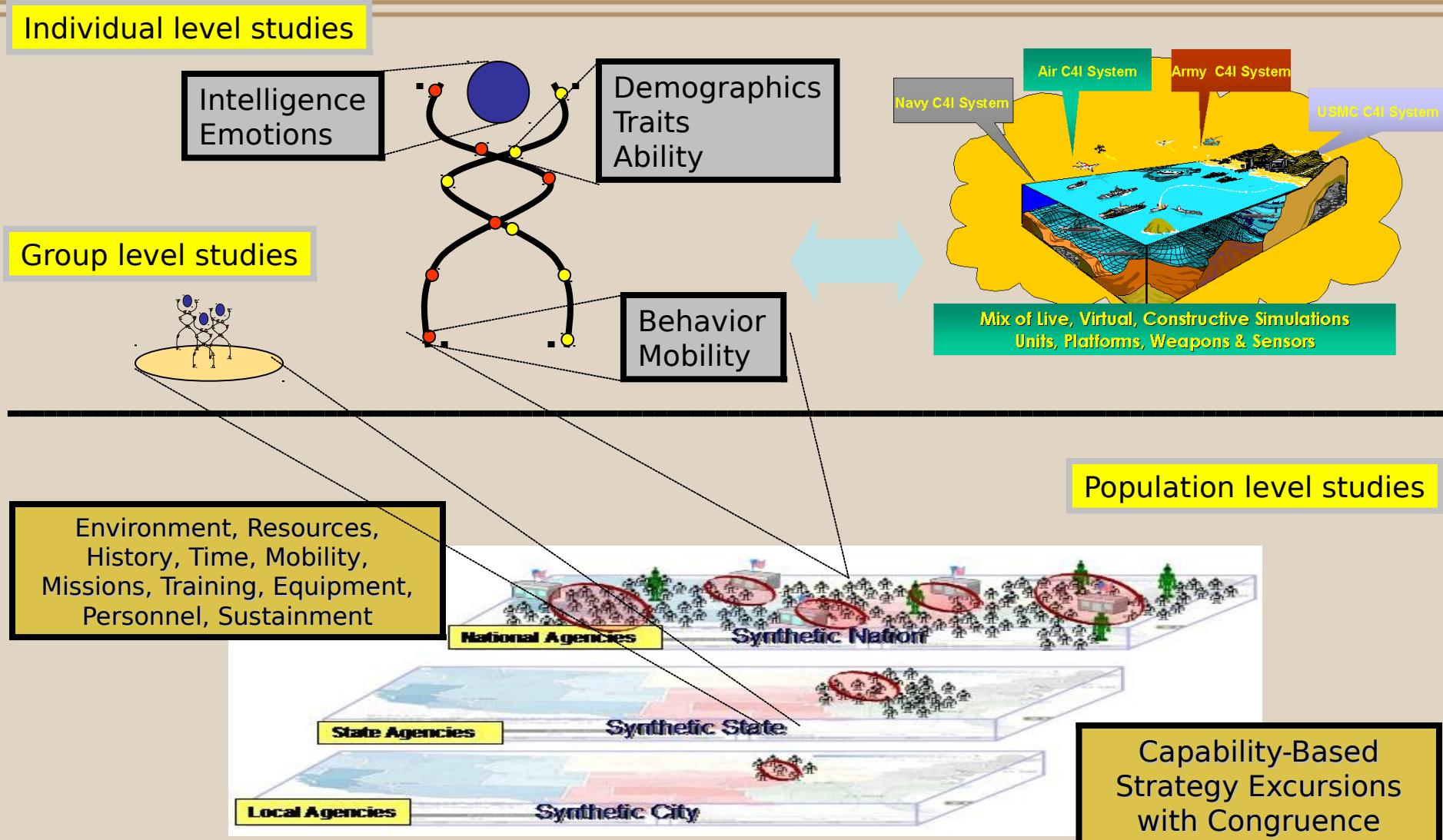
ACCESS - towards a Continuous Experimentation Environment

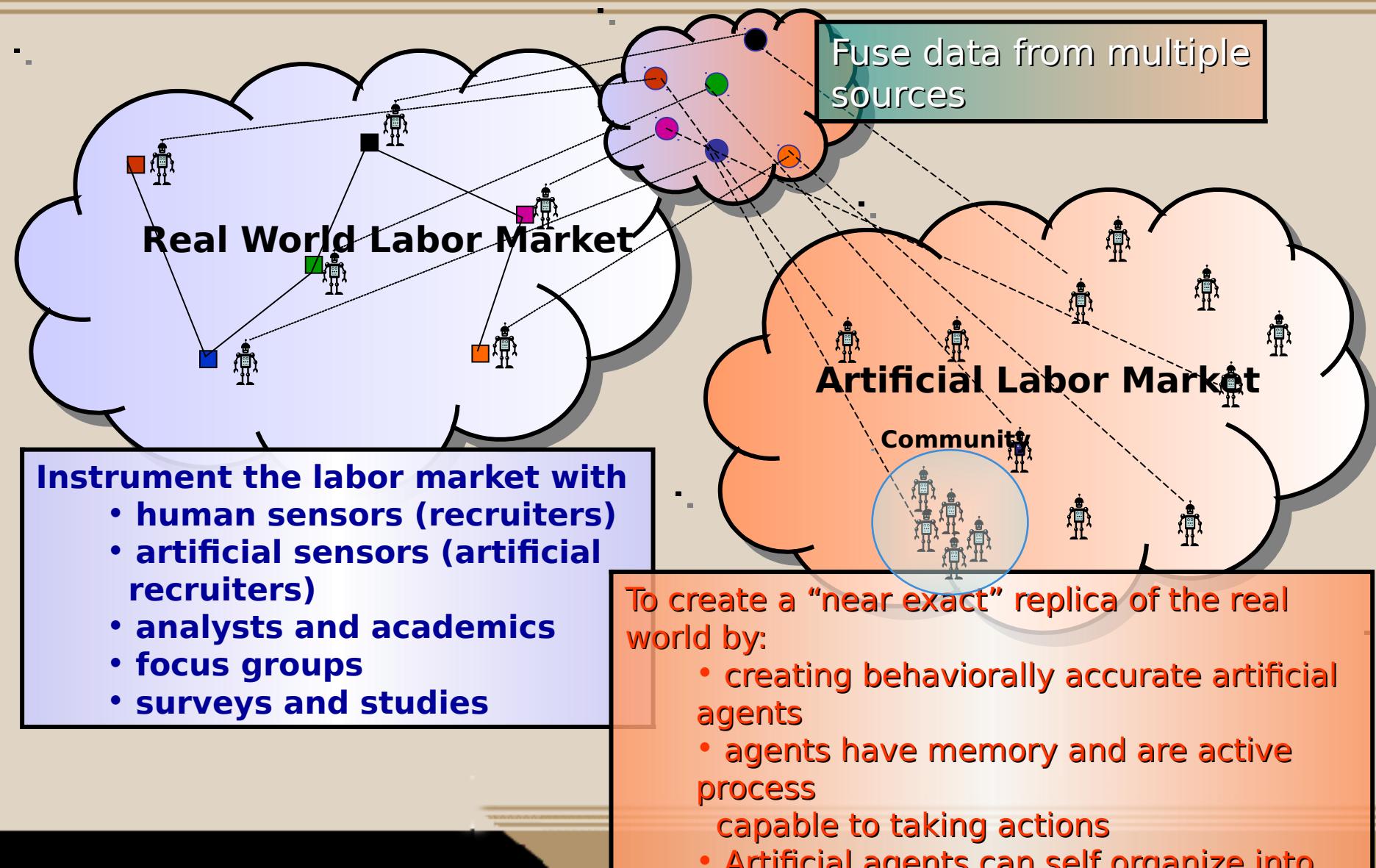
- ACCESS supports the examination of multiple topics regarding Legacy, Interim, and Objective Force accessions
 - Current or anticipated future world events can be simulated to determine the affect on accession / selection processes
 - Artificial Labor Market (ALM) responds to world events and affects agent inclination toward recruiting efforts
 - Incentive strategy COAs wargamed in regard to ALM and agent behavior
 - Innovative solutions derived from COA development and simulation outputs
- Incorporates Cadet officer accessions



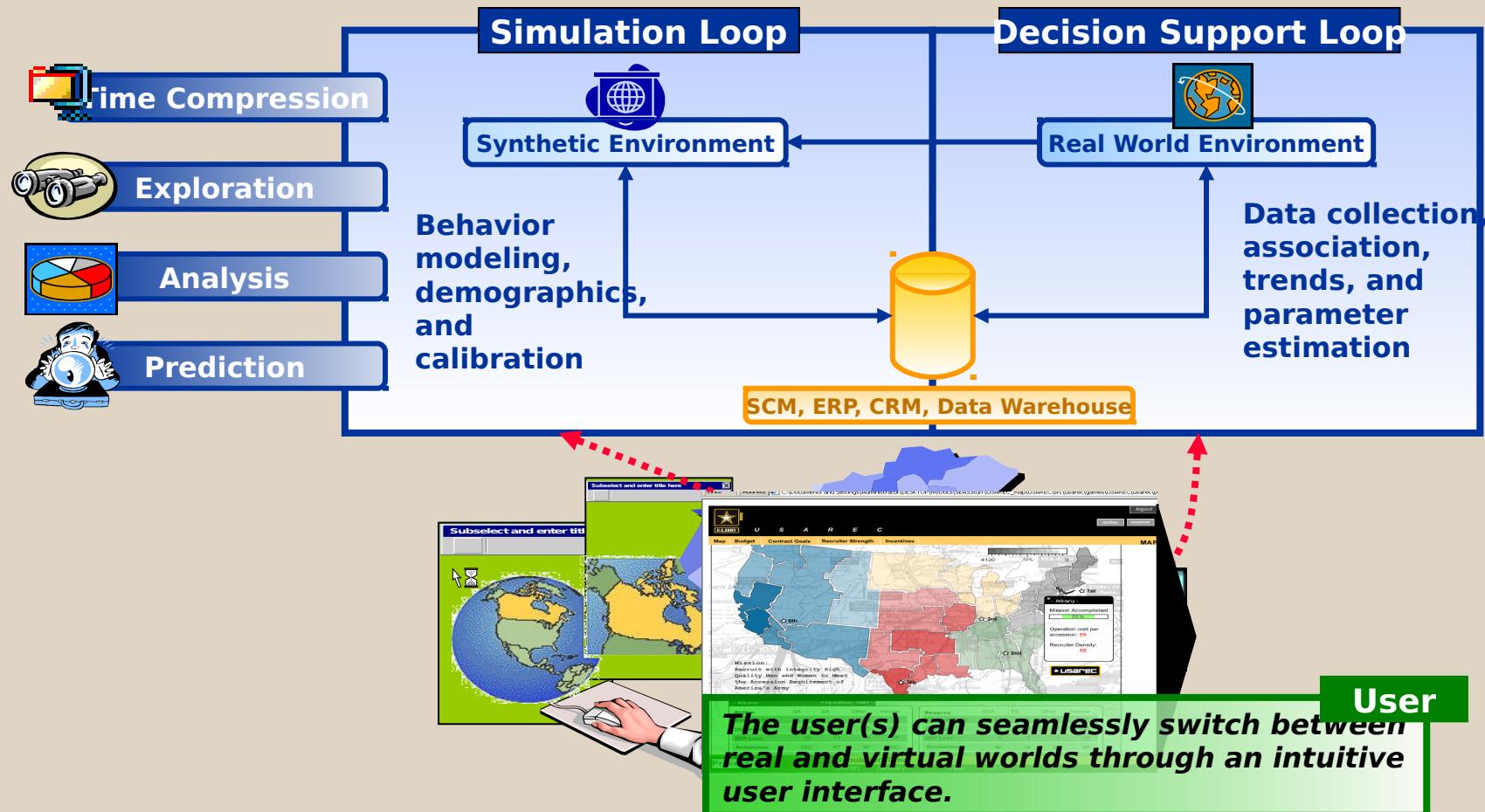
Ability to rapidly experiment with Courses of Action

Accessions Command Continuous Experimentation and Simulation System (ACCESS)

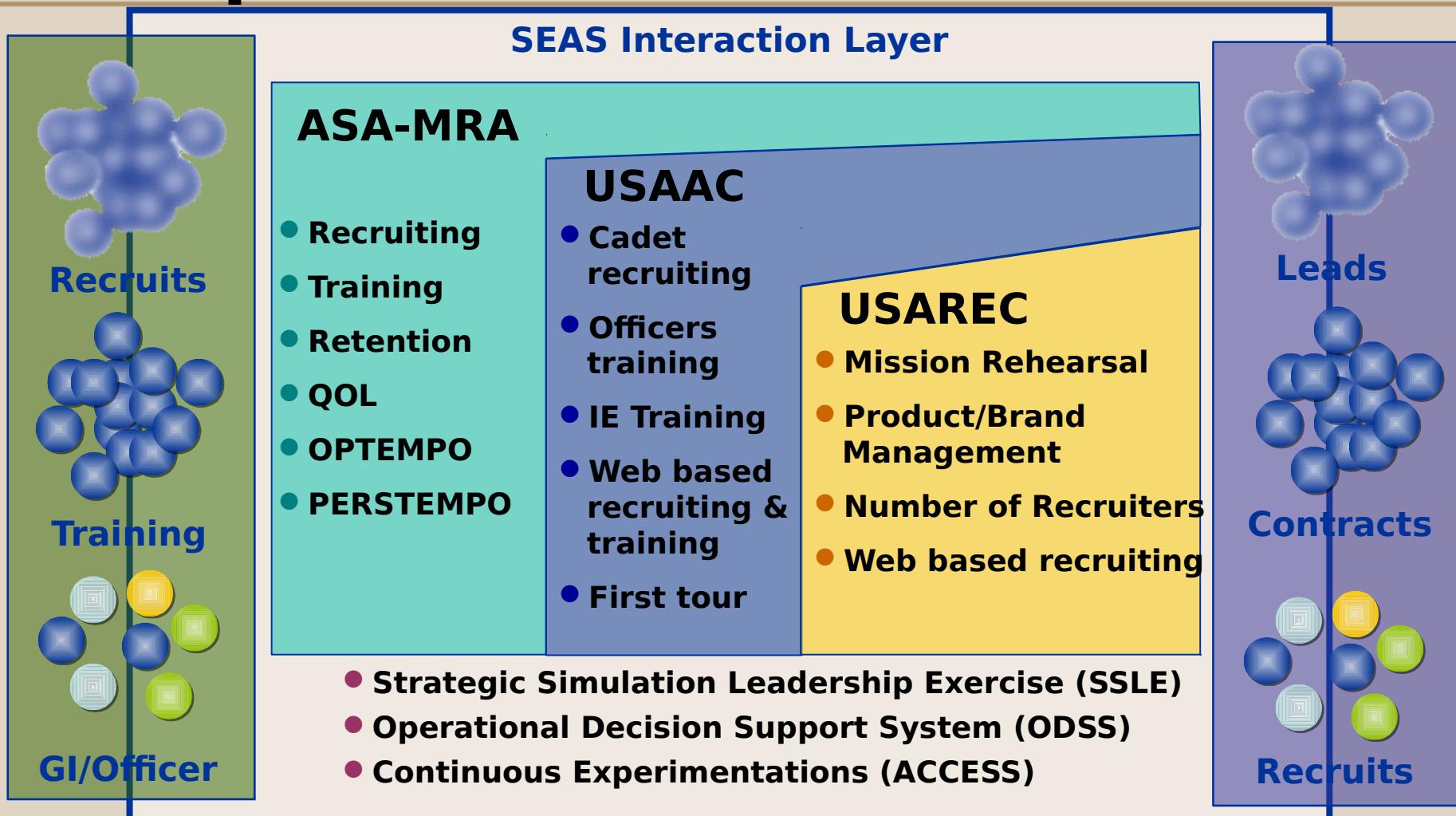




ACCESS: An integrated Continuous Experimentation Environment



Single Environment, Multiple Views

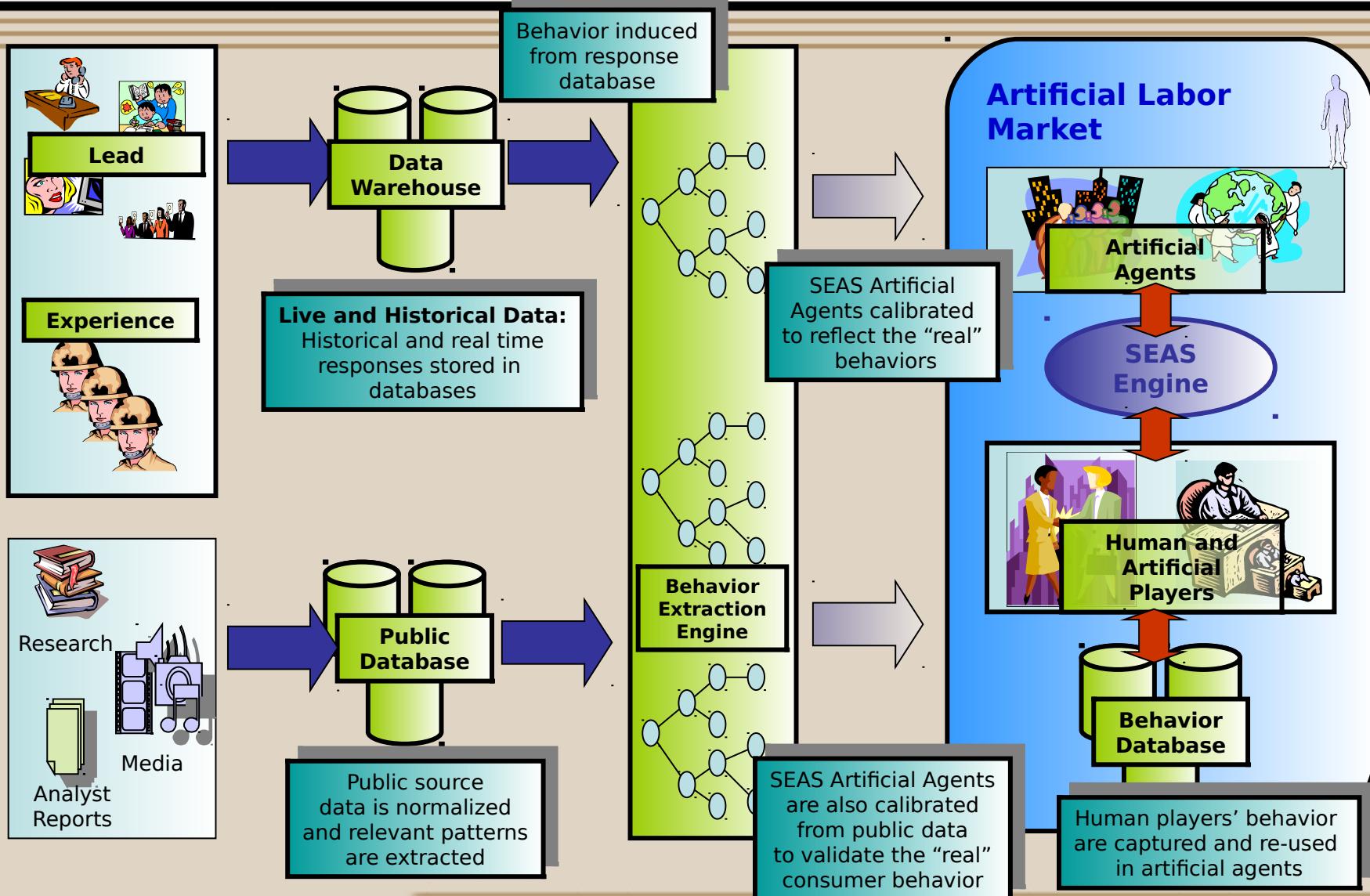


Single Integrated Manning Environment

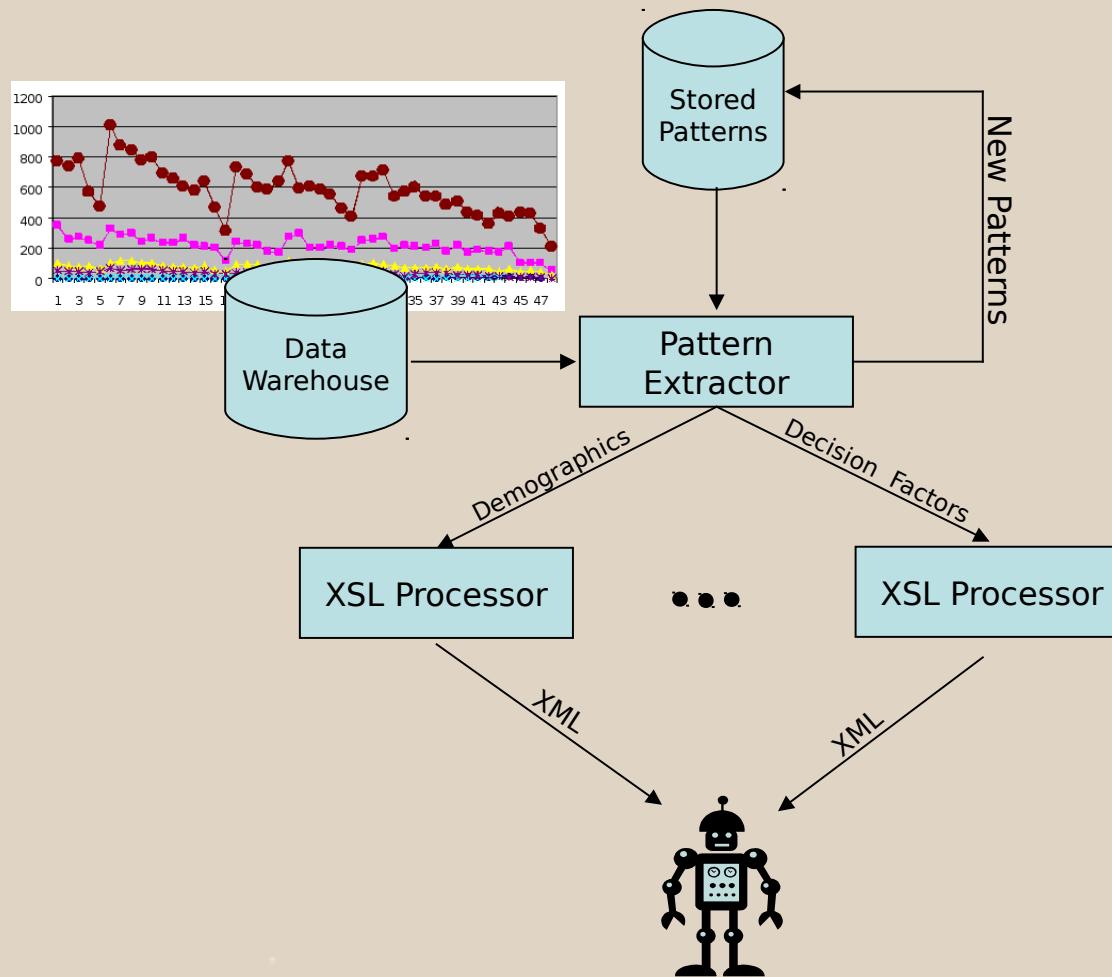


Artificial Labor Market: Creation and Calibration

Semi-Automated Configuration Process



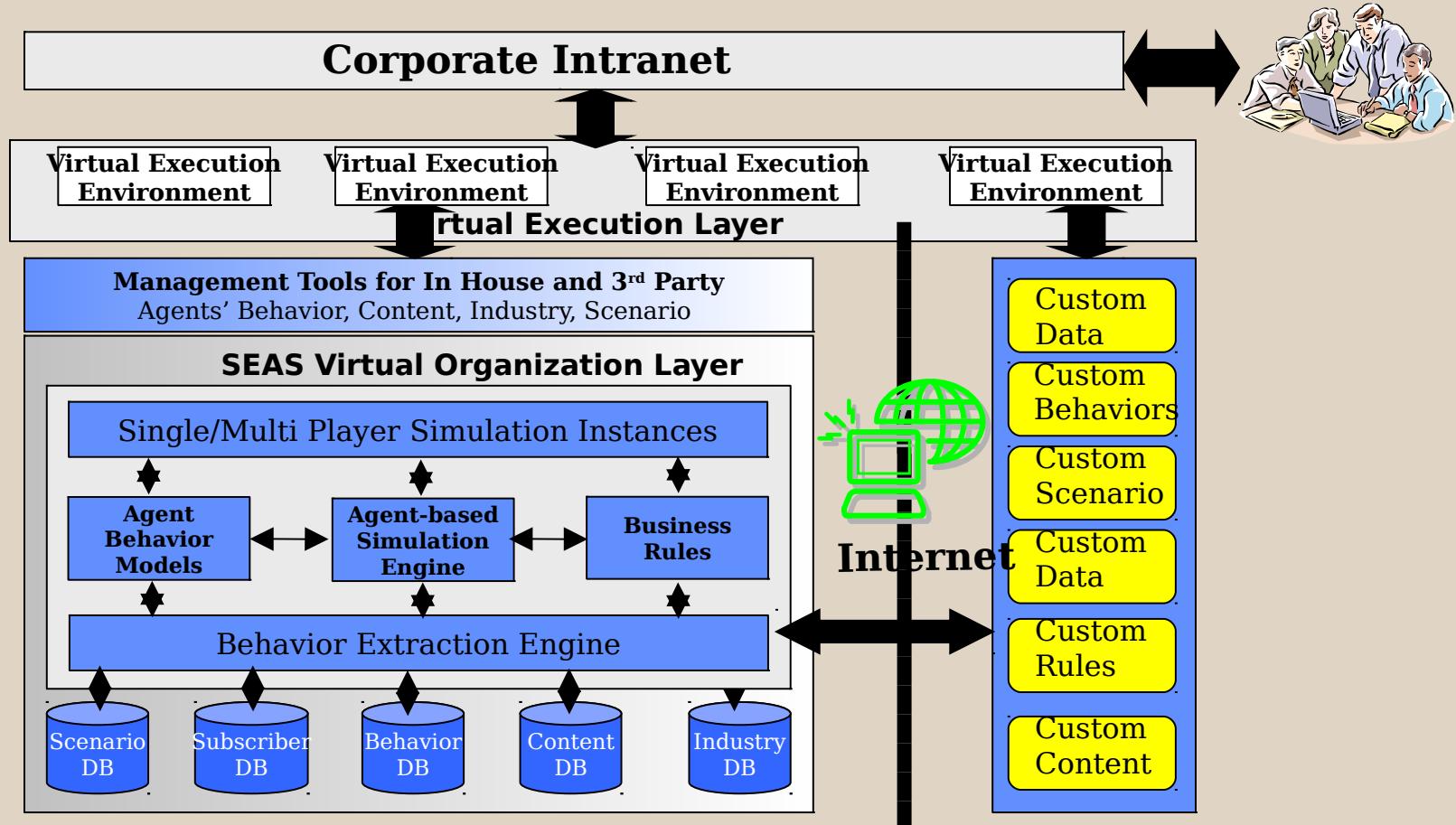
Agent Creation and Calibration Process



Performance Moderators

Emotional Moderators	Mental Moderators	Social Moderators	Physiological Moderators	External Moderators
Morality	Short-term memory	Leadership ability	Coordination	Time
Stress management	Long-term memory	trust in higher	Level of fatigue	Weather Conditions
Morale level	Indecisiveness	Cohesion of group	Pain threshold	Noise
Emotional state	Learning ability	Commitment level	Presence of wounds	Pollution
Risk-taking inclination	Analytical ability	Cooperation	Presence of disease	Illumination
	Experience level	Cultural values	Muscular strength	
	Knowledge level	Length of group association	Precision of movement	
	Level of uncertainty		Stealthiness	
	Attention span			
	Problem-solving skills			
	Memorization ability			
	Task management			
	Sensation ability			
	Perception ability			
	Attentiveness			

Secure remote execution



SSLE -- Web-based, Distributed



ARMY

Accession Goals Recruiter Strength Budget Incentives Status

Active Reserve

Budget

Budget Screen Information

You now have the budget amount allocated from Congress, determine how much money to spend, and how much to allocate to USAREC. Please note: all these numbers are displayed in thousands.

Army Budget from Congress

Army		
	Current Received	Budget year Allocated
Operation and Maintenance Fund	24,841,000	24,000,000

Army Budget to USAREC

USAREC Data	Last Year's Request from USAREC	This year's allocation to USAREC
Special Programs	63,701	63,701
Operations	207,852	259,815
Incentives	208,692	208,692
Advertising	98,149	98,149



U S A R E C

Contract Goals Recruiter Strength Budget Incentives Status

Active Reserve

Budget

Budget Screen Information

After receiving the budget amount allocated from Army Group determine how much money to spend and how much to allocate to each brigade. Please note: all these numbers are displayed in thousands.

	Current Year	Budget Year
USAREC	Received	Received
Special Programs	63,701	63,701
Operations	207,852	207,852
Incentives	208,692	208,692
Advertising	98,149	98,149

HQ Budget

Enter data once budget is received from Army Group

	Current Year	Budget Year
HQ Operations	76,163	76,163
HQ Special Programs	58,392	58,392
National Advertising	93,885	93,885

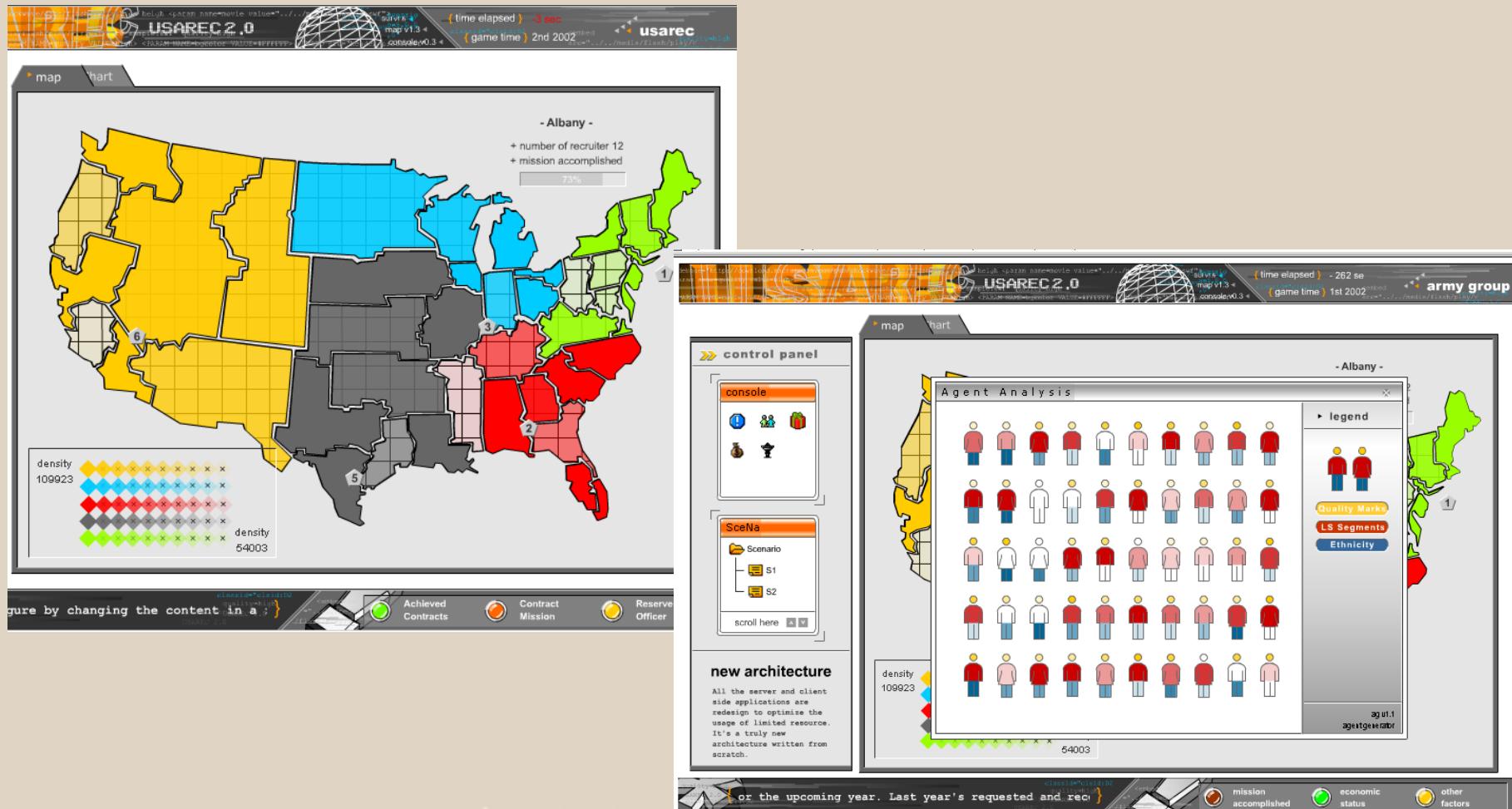
Brigade Budget

Enter data once budget is set in HQ

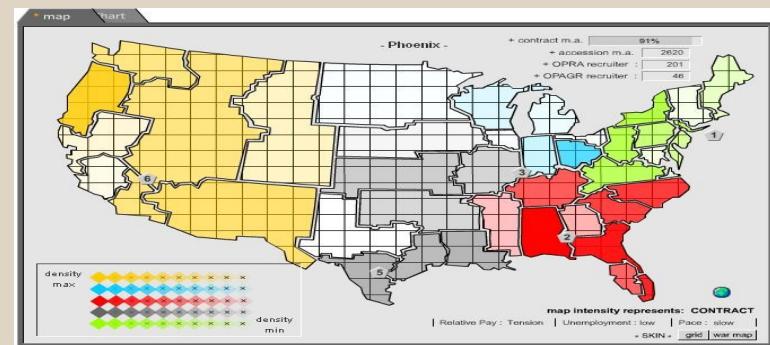
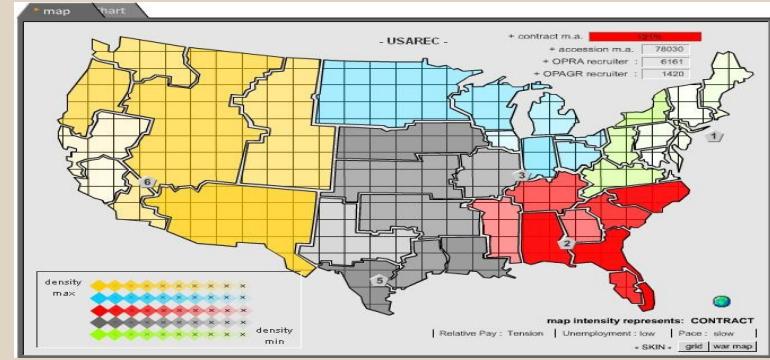
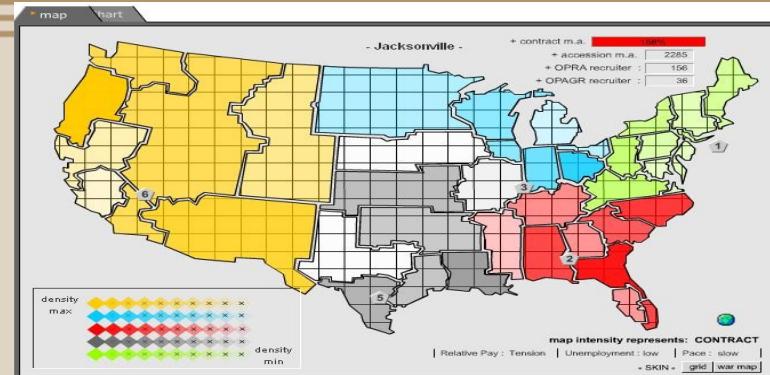
	Current Year	Budget Year
1st Brigade	Allocated	Allocated
Operations	9,426	9,426
Special Programs	753	753
Advertising	839	755

	Current Year	Budget Year
2nd Brigade	Allocated	Allocated
Operations	25,430	25,430
Special Programs	731	731
Advertising	906	816

SSLE and ODSS Visualization Tools



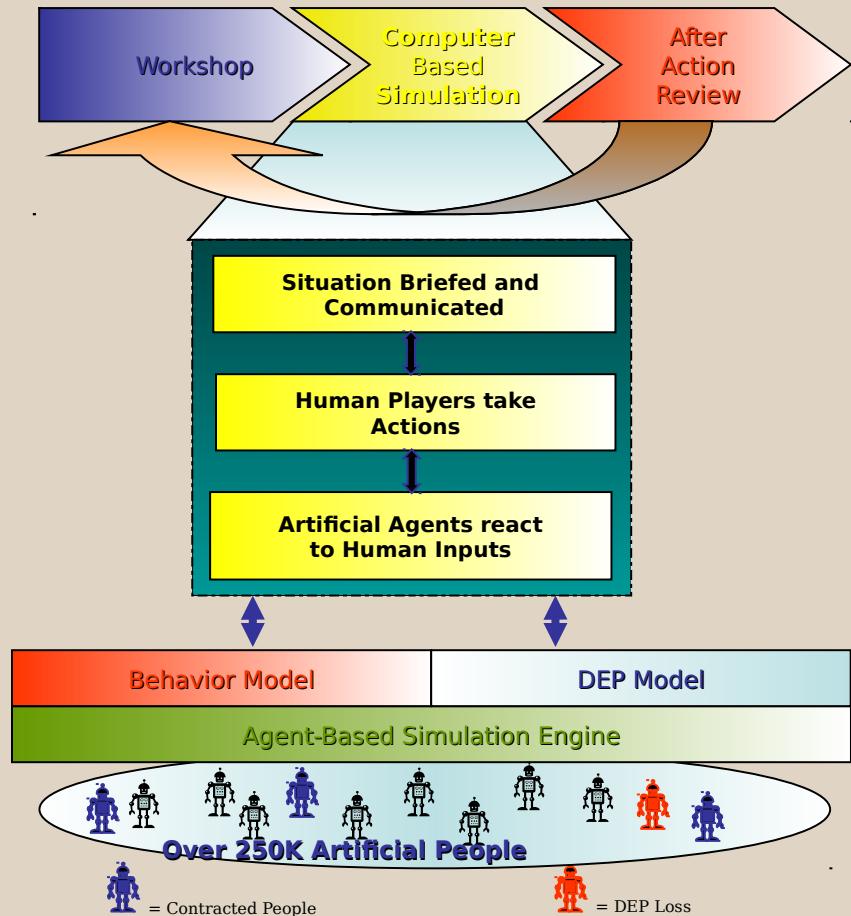
- Dynamic Mouse over:**
 - Mouse over each color square to see their name and the exact value for each attribute.
- Color intensity indicator**
 - Color intensity shows the completion of each mission.
- Quick Chart**
 - Want to see more detailed break down then just the color intensity? Click on the attribute you desire and a Quick Chart give you all the data you need!
 - Compare attributes- Click the attributes you want to display Quick Chart will shown your break down.
- Scenario Navigator**
 - Each time tick of the simulation contains valuable information. With the SceNa tool you can navigate time!
 - Select the Scenario you want to view



SSLE Process

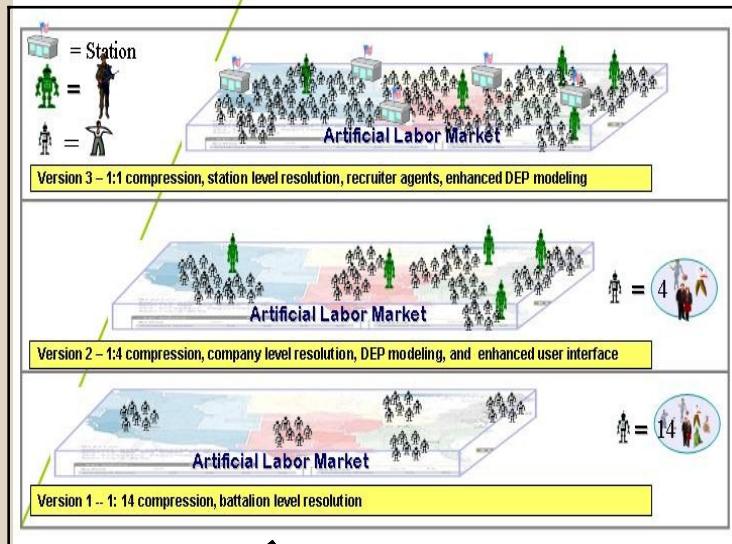
■ SSLE Objectives

- Improve decision-making.
- Engage in a systems perspective.
- Improve teamwork.
- Identify early warning signs.
- Provide decision test-bed.



Future Capabilities

Evolution of SSLE



Strategic Thinking



Continuous Experimentation

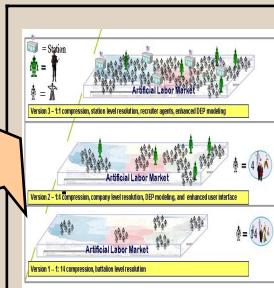
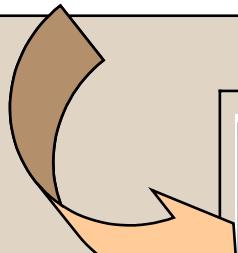


ACCESS ALM

Staff Training



ALM Lite



Future simulation capabilities for OF

- **Objective Force - Strategies**

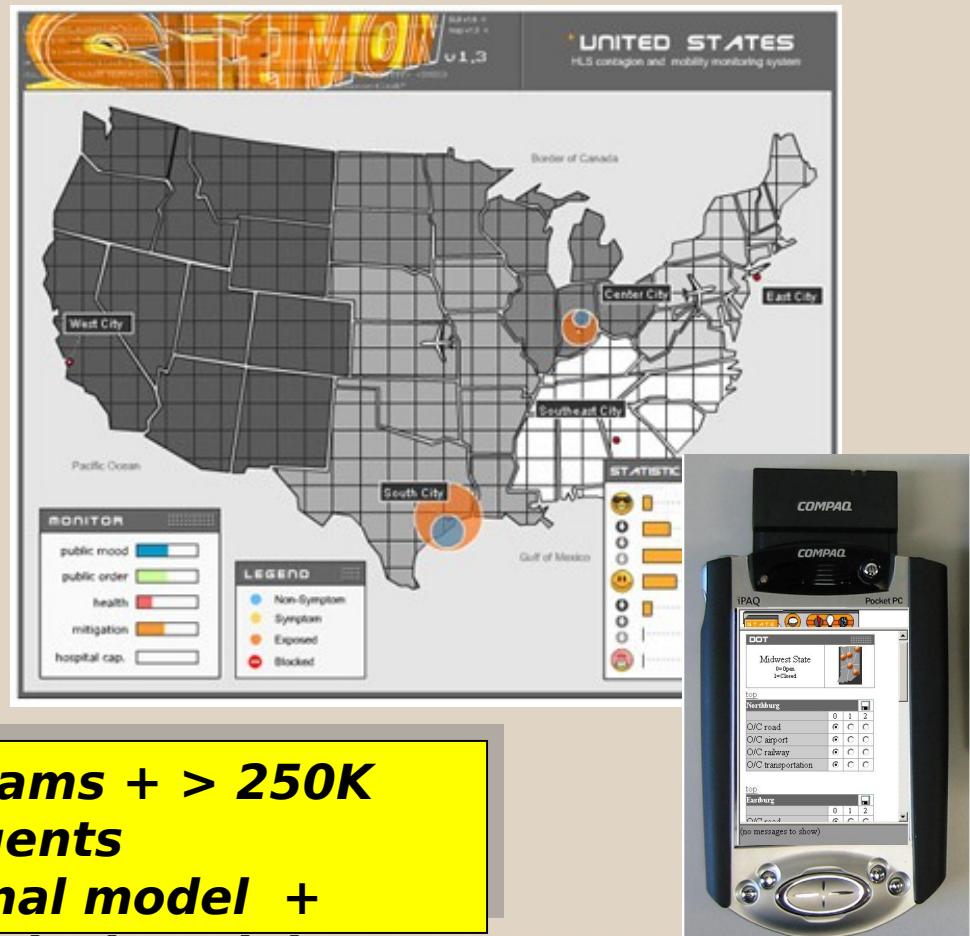
<u>ATTRIBUTES</u>	<u>INDICATORS</u>	<u>STRATEGIES</u>
Mentally sharp	P-SAT, SAT, DLPT	DoD sponsored SATs,
training	Interviews	H.S. language
Physically tough ball players	Sport team member	Recruit H.S. & college
Disciplined	Clean record	Army/H.S. sponsor program
Decision Makers	Community involvement	Army Community programs
Achievers	Dedication, commitments	Education benefits, training with industry
Proud	Selfless service	JROTC, National Campaigns, National Service Degrees
Math & Science noncombatant higher education	Techies	Specialist ranks for jobs, outsourcing,

- **Objective Force - Strategies**
 - Recruiters
 - Human Resource trained generalists/specialists
 - Targeted recruiting efforts to place scientist or infantryman
 - Staffing
 - Consolidated career fields with egalitarian structure
 - Transfer between AC/RC commonplace
 - Re-institute specialist ranks (SP1-SP9) to reflect tech roles
 - Strategic Outreach
 - Northern Command, Selective Service, Homeland Security, DoD institutional support overlapping/redundant effort

Other SEAS Implementations

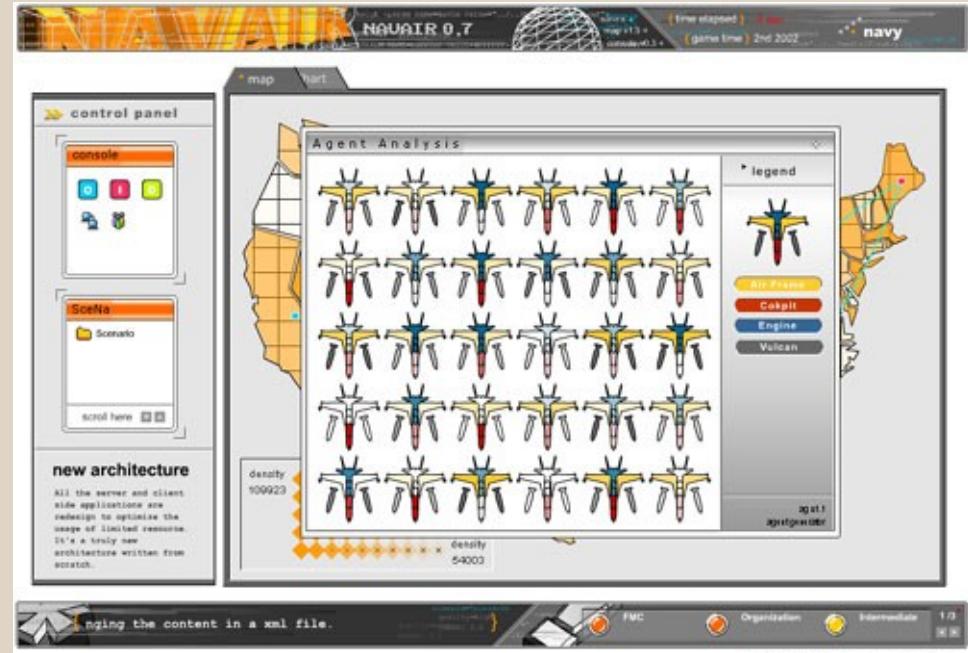
Homeland Security Simulation

- A vehicle to promote understanding and dialogue on actions and issues related to the development of an effective homeland Security program
- A forum and base for mutual understanding between agencies and players involved in Indiana homeland security
- A tool for decision makers to test potential resources allocation and planning options in a virtual environment



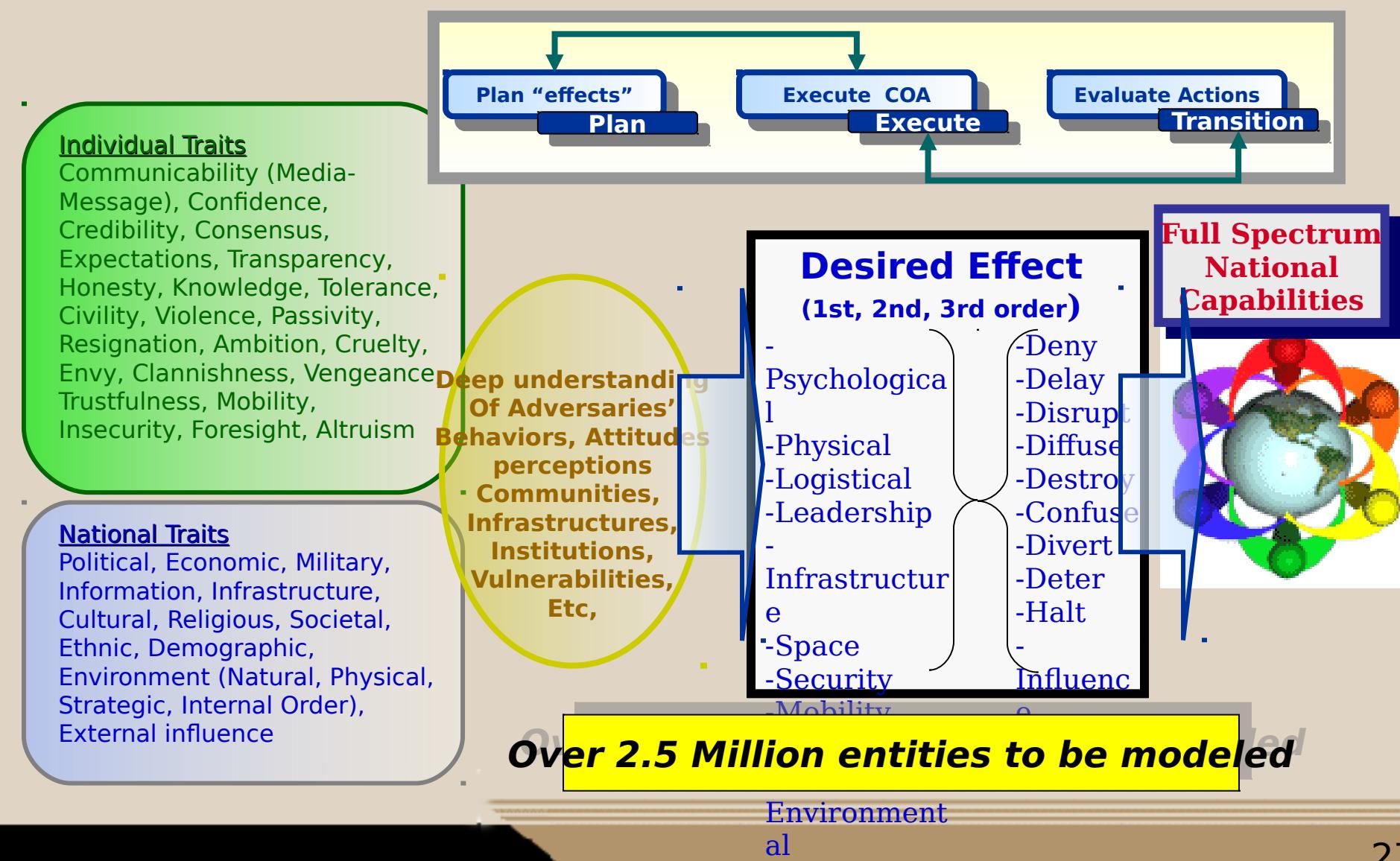
**9 human teams + > 250K
agents
+ emotional model +
epidemiological model +
mobility model**

- Can NAVAIR anticipate supply bottleneck and interruptions
- How much risk is acceptable
- What business model will give best balance between cost and readiness
- What technology investments will enable long-term supply chain management



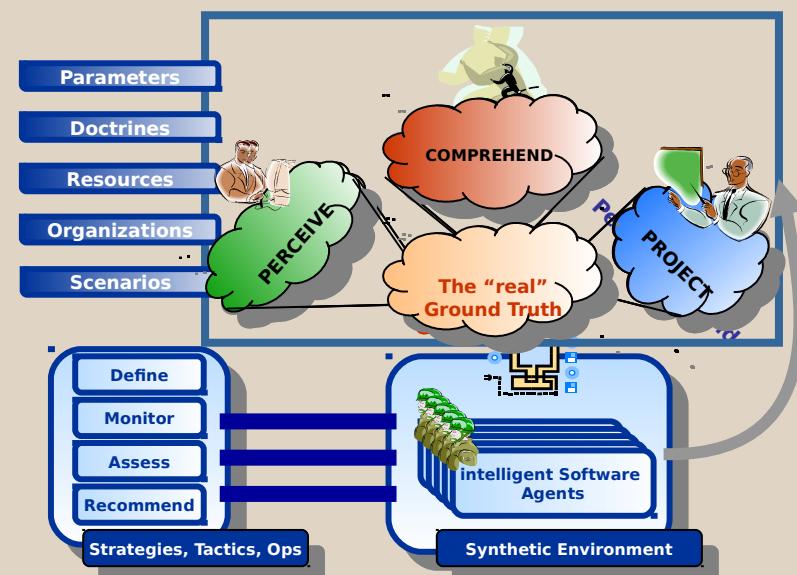
9 human teams + > 1000 agents + 3 different business models

Proposed JFCOM Effect Based Operation



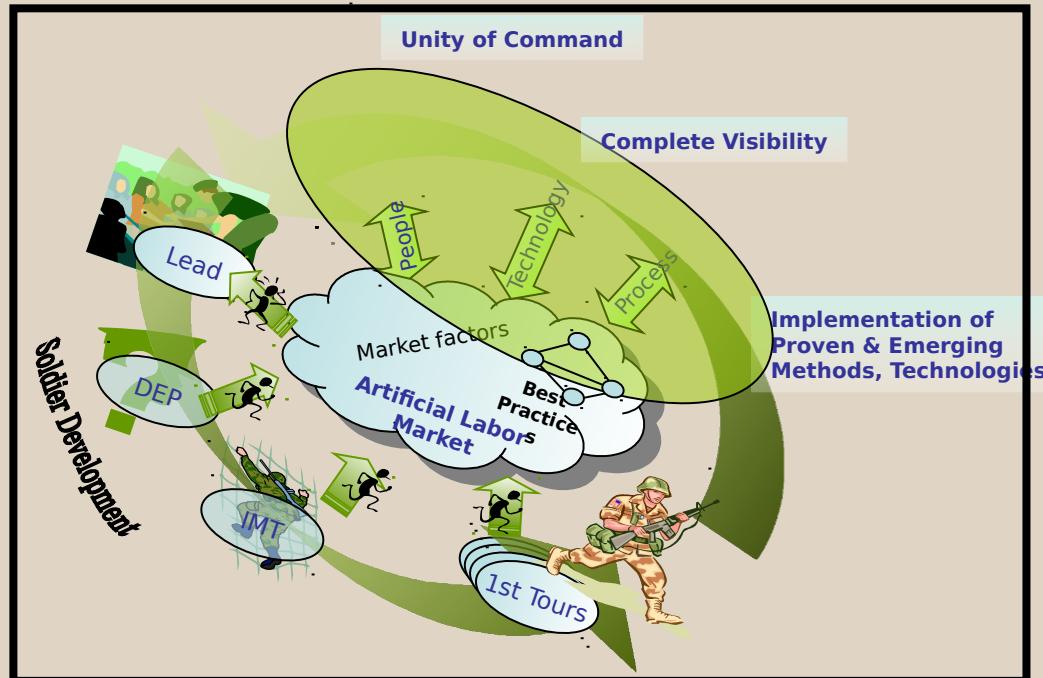
In Summary..

- **Parallel Worlds represented for rapid continuous experimentation on the fly**
 - **Real World represented by Event templates and Situation templates to portray actual labor market conditions and national security levels if the nation is at war, peace, or otherwise engaged**
 - **Virtual World of programmable labor market agents react to anticipated world events and futuristic scenarios**
 - **Agent-Based Concept Model (ABCM) models the information flow/data flow and/or work flow within a system allowing for the dynamic expression of products**



In Summary (Cont.)..

- ACCESS's multi-layered simulation allows for rapid experimentation of accession operations by incorporating:
 - Decision Support System to conduct MDMP, abbreviated MDMP, COA development, staff interaction, and plans and policies
 - Constructive Simulation - simulated recruiters operate simulated systems after humans provide inputs - produces emergent outcomes
 - Virtual Simulation - real people operate simulated systems to improve communication and decision skills
 - Live Simulation - real people operate real systems in distributed areas of operations with actual equipment to gauge accessions
 - Tied to Unified Combatant Command manning requirements for a capabilities-based force



Question s?

